Amendments to the Specification

Please amend the specification as follows.

Please replace the paragraph that begins on the bottom of page 1 and ends on page 2 with the following amended paragraph.

Histoplasma capsulatum is a dimorphic fungal pathogen capable of causing acute pulmonary disease in otherwise healthy individuals and lethal disease in immunocompromised humans (Ampel, 1996, *Emerg. Infect. Dis.*, 2: 109-116; Eissenberg, 1994, *The Interplay Between Histoplasma Capsulatum and Its Host Cells*, Vol, I, Ch. 6, W.B. Saunders Company, Ltd. London, UK; Wheat *et al.*, 1985, *Am. J. Med.*, 78: 203-210). In its most serious form, the infection disseminates throughout the body. Disseminated histoplasmosis, coinciding with laboratory evidence of HIV infection, is regarded sufficient for a diagnosis of AIDS (Castro *et al.*, 1992, *MMRW 41*: 1-14). Although AIDS currently represents the most prevalent immunocompromising disease of humans, a variety of other conditions or medical treatments can impair the human immune system and create susceptibility to diseases caused by the primary pathogen *H. capsulatum* and associated opportunistic pathogens (Goodwin et al., 1981, Medicine (Baltimore) 60: 231 [[321]]-266). These predisposing conditions include advanced age, diabetes, cancer chemotherapy, or immunosuppression induced to prevent rejection of transplanted organs (Wheat *et al.*, 1982, *Ann. Intern. Med.*, 96: 159-163; Davies *et al.*, 1978, *Am. J. Med.* 64: 94-100).

Please replace the first full paragraph on page 2 with the following amended paragraph.

In nature, *H. capsulatum* exists as a mycelium that is well-adapted for a saprotrophic mode of growth in soil (Scherr & Weaver, 1953, *Bact. Rev.* 17: 51-92). After entrance of microconidia or mycelial fragments into a mammalian host, *H. capsulatum* differentiates into budding yeast (Maresca *et al.*, 1994, *Trends Microbiol.*, 2: 110-114). In the animal host, the fungus experiences significant host-induced or environmental stress, including heat shock, exposure to higher osmolarity, changes in pH,

and oxidative stress (Deepe, 1994 ~~1998~~, *J. Lab. Clin. Med.* 123: 201-205; Eissenberg & Goldman, 1994, *The Interplay Between Histoplasma Capsulatum and Its Host Cells*, Vol, I, Ch. 6, W.B. Saunders Company, Ltd., London, UK; Newman, 1999, *Trends Microbiol.*, 7: 67-71). The ability to resist or overcome environmental or host-induced stress is likely to be important for continued growth and virulence of *H. capsulatum*. In addition, host-induced or environmental stress may trigger changes in gene expression necessary for virulence.

Please replace the fourth full paragraph on page 7 with the following amended paragraph.

FIG. 4. shows the sequence for *H. capsulatum* chitin synthase 2 polypeptide (SEQ ID NO: 23) in accordance with an embodiment of the present invention.

Please replace the paragraph that begins on the bottom of page 7 and ends on page 8 with the following amended paragraph.

FIG. 5 illustrates an alignment of *H. capsulatum* chitin synthase 2 polypeptide (Hcchs2) (SEQ ID NO: 23) with chitin synthase proteins from *Coccidioides immitis* (Ci) (SEQ ID NO: 24), *Aspergillus fumigatus* (Af) (SEQ ID NO: 25), and *Aspergillus nidulans* (Ani) (SEQ ID NO: 26). Also shown is the consensus sequence (SEQ ID NO: 27). The Multalin program using the default settings provided on the website (Multiple sequence alignment with hierarchical clustering, F. Corpet, 1988, *Nucl. Acids Res.* 16(22), 10881-10890; (available over the internet ~~at URL:http://prodes.toulouse.inra.fr/multalin/multalin.html~~). Settings for symbol comparisons are described in S. Henikoff and J.G. Henikoff (1992, *Proc. Natl. Acad. Sci. USA*, 89, 10915-10919) using the original Blosum62 settings with a value of 4 added to each entry to be non-negative. The gap penalties (also the default settings as provided on the web site) are subtracted to the alignment score of 2 clusters each time a new gap is inserted in a cluster. The penalty is length dependent: it is the sum of "penalty at gap opening" and of "penalty of gap extension" times the gap length; both values must be non-negative; the maximum for both values being 255. The similarity score is equal to the sum of the values of the matches (each match scored with the scoring table) less the

gap penalties. The gap penalty is charged for every internal gap. By default, no penalty is charged for terminal gaps.

Please replace the first full paragraph on page 17 with the following amended paragraph.

The 5' primer (iRCATBProm5') may be tagged with a 5' *EcoRI* site followed by an internal *BclI* site. The 3' primer (iRCATBProm3') may be tagged with a *SalI* site. Next the *Ura5* terminator sequence may be obtained by PCR, using the pBY33 vector as template ~~(Dr. William Goldman, Washington University)~~. The amplified sequence may then be tagged with a 3'- *SalI* sequence and an internal *BclI* sequence, a 5' *SalI* sequence, and ligated with the 3' end of the catalase B sequence using the pBS *Xho I* multiple cloning site.

Please replace the paragraph that begins on the bottom of page 21 and ends on page 22 with the following amended paragraph.

In yet another embodiment, the method comprises using real-time PCR wherein the PCR product is detected by the use of fluorescent dyes to detect the biosynthesis of products (FIG. 9). Real-time PCR uses incorporation of a fluorescent label as a means to monitor the amplification of PCR product via florescence resonance energy transfer (FRET) (Leutenegger, C.M., *et al.*, 2001, *AIDS Res. Hum. Retroviruses*, 17: 243-251, Nadkarni, M.A., *et al.*, 2002, *Microbiology*, 148: 257-266; S.J. Wall and D.R. Edwards, 2002, *Anal., Biochem.*, 300: 269-273). Commercially available thermocyclers and probes are the LightCycler and probes from Roche Applied Science, the SmartCycler from Cepheid (Sunnyvale, CA), the GeneAmp 5700 and Prism 7700 cyclers from Applied Biosystems (Foster City, CA), the iCycler iQ from BioRad (Hercules, CA) and probes from Molecular beacons ~~(www.molecularbeacons.com)~~ (Cockerill, F.R., *et al.* 2002, *ASM News*, 68: 77-83). The methodology is adaptable to both PCR and RT-PCR techniques, and in many cases, results are obtained in less than 1 hour (see e.g., FIG. 9A, showing products at each amplification cycle). As shown in FIG. 9B, real-time PCR may be used to provide a rapid, and unequivocal detection of *H. capsulatum* infection. The PCR product for these experiments was again generated using primers Hcchs2RT(2)5':

5'-CTACCTGTGATCCCAACGAG-3' (SEQ ID NO: 15) and Hcchs2RT(2)-3': 5'-ACGCCATCCTGGTAGATTCC-3' (SEQ ID NO: 16) that hybridize to exon 3 of the chitin synthase 2 gene to produce a 310 bp (base pair) product.

Please replace the first full paragraph on page 28 with the following amended paragraph

Thus, upon introduction into the host, fungi experience significant environmental and/or host-induced stress, including heat shock, exposure to higher osmolarity, change in pH, and oxidative stress (Deepe, 1994 ~~1998~~, *J. Lab. Clin. Med.* 123: 201-205; Eissenberg & Goldman, 1994, *The Interplay Between Histoplasma Capsulatum and Its Host Cells*, Vol, I, Ch. 6, W.B. Saunders Company, Ltd., London, UK; Newman, 1999, *Trends Microbiol.*, 7: 67-71). The ability to resist or overcome environmental or host-induced stress is likely to be important for continued growth and virulence of *H. capsulatum*. In addition, host-induced or environmental stress may trigger changes in gene expression necessary for virulence.